Peripheral - ECAT EtherCAT® slave controller

XMC™ microcontrollers
July 2016

Agenda

1	ECAT overview
2	Key feature: smallest fully integrated EtherCAT® slave
3	Key feature: fully compatible with Beckhoff's ET1100 ASIC
4	Key feature: multiple on chip trigger connection
5	System integration
6	Application example

Agenda

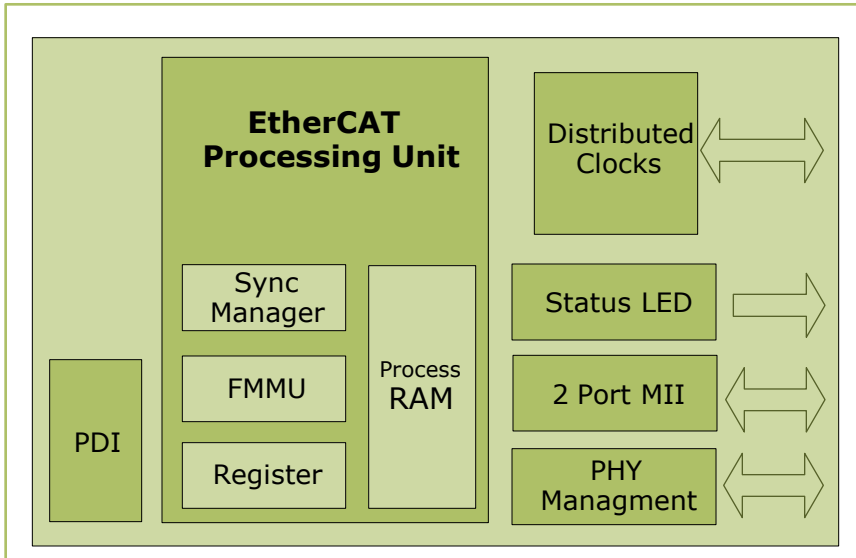|	
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ECAT
EtherCAT® slave controller

Highlights

EtherCAT® is one of the major Industrial Real Time Ethernet protocols with Ultra high-speed right up to the terminal Outstanding performance, flexible topology which save costs for additional Ethernet equipment (Switches) and simple configuration characterize EtherCAT®

Key features

Smallest fully integrated EtherCAT® Slave Node

Fully compatible with Beckhoff's ET1100 ASIC

Multiple on chip trigger connection using Sync/Latch signals

Customer benefits

› Scalable from a 100 QFP package up to a 196 LFBGA fully integrated

› Avoids complex porting of EtherCAT® stacks, reuse of own written stacks

› Use of Sync/Latch signals to trigger the internal ADC/CCU or capture from CCU

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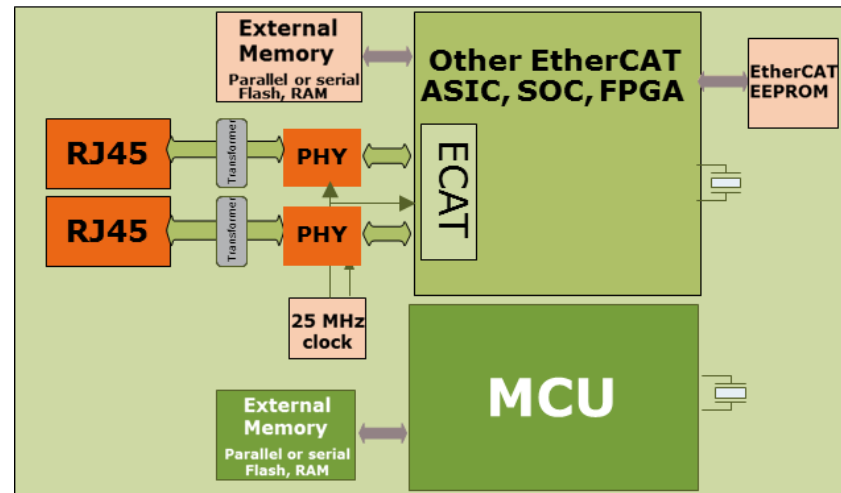**4**   Key feature: multiple on chip trigger connection

5   System integration

**6**   Application example

› EtherCAT® ASIC's, SOC and FPGA need additional components

   – ASIC's need a micro

   – FPGA need external memory's and are in big BGA

   – Clocks must be supported twice in some topologies

› XMC4800 combines all that in a 100 QFP

   – No external components needed

   – Easy to be handled in PCB production

   – Many different interfaces available in one package

ECAT
Smallest fully integrated EtherCAT® slave (2/2)
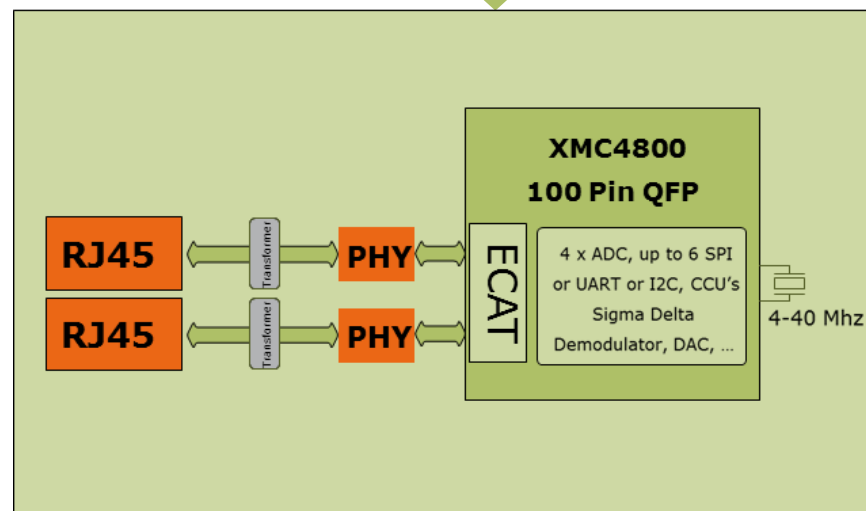
Scalable from 100 LQFP to 196 LFBGA

› 100 Pin LQFP Pin & Signal compatible to XMC4500 and XMC4400 100 Pin devices

› 144 Pin LQFP Pin & Signal compatible to XMC4500

› 196 LFBGA is an extension of the XMC4500 144 ball LFBGA

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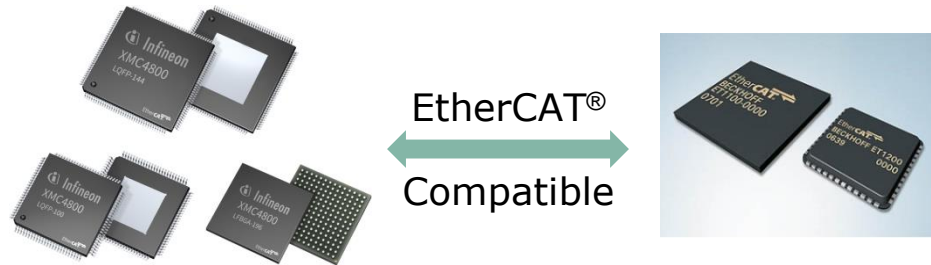
4 Key feature: multiple on chip trigger connection

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ECAT
Fully compatible with Beckhoff's ET1100 ASIC

EtherCAT®
Compatible

› EtherCAT® implementation of the Beckhoff ET1100 and XMC4800 are compatible

- 2 x MII Ports for Ethernet PHYs

- 8 SYNC Manager

- 8 FMMU's

- 8kB Process Data RAM

- 64 Bit Distributed Clocks

› Register Interface is exactly the same

- Easy porting of existing software solutions for ET1100 to XMC4800

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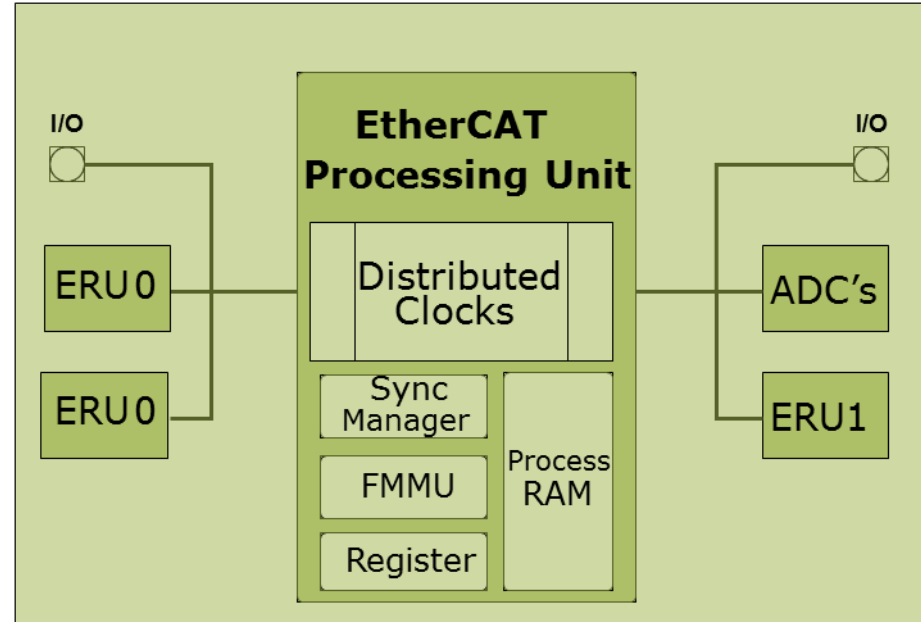**4** Key feature: multiple on chip trigger connection

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ECAT
Multiple on chip trigger connection

› Input of Latch signals can be generated by both ERU and pins

  – ERUs combine combinatorial signal combinations and module/protocol trigger

› Sync outputs are available on pins, can be used as ADC trigger and via ERU connected to CCU4/8, DSD, POSIF

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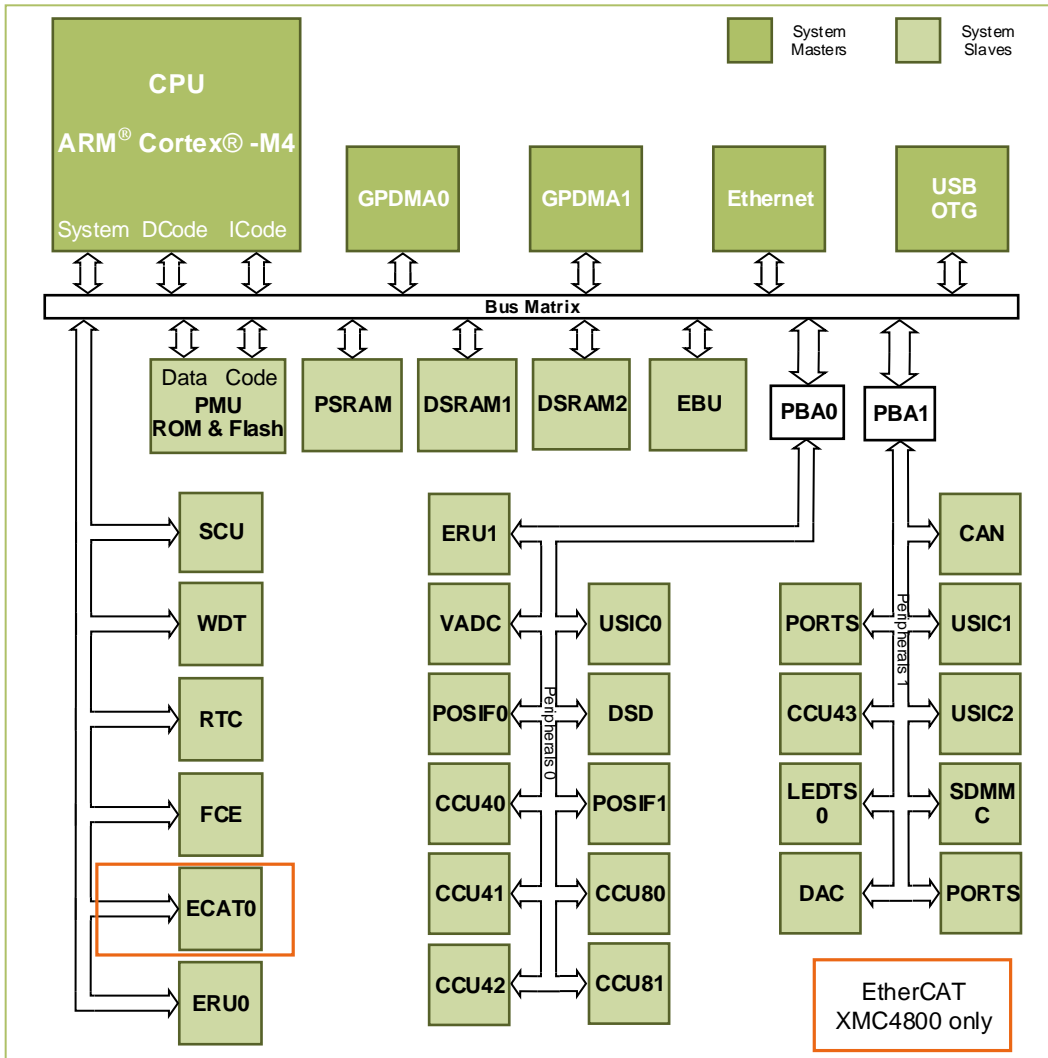
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ECAT
System integration

System integration

Due to the multilayer bus matrix, CPU can operate EtherCAT® data while a Ethernet DMA moves data to an internal memory without timing penalty.

Complex application scenarios can be realized by a highly flexible internal integration of several standard communication interfaces.

Target applications

› Intelligent I/Os and PLCs

› Industrial drives

XMC4000			XMC1000		
4100	4200	4400	1100	1200	1300
4500	4700	**4800**	1400		

Agenda

Application example
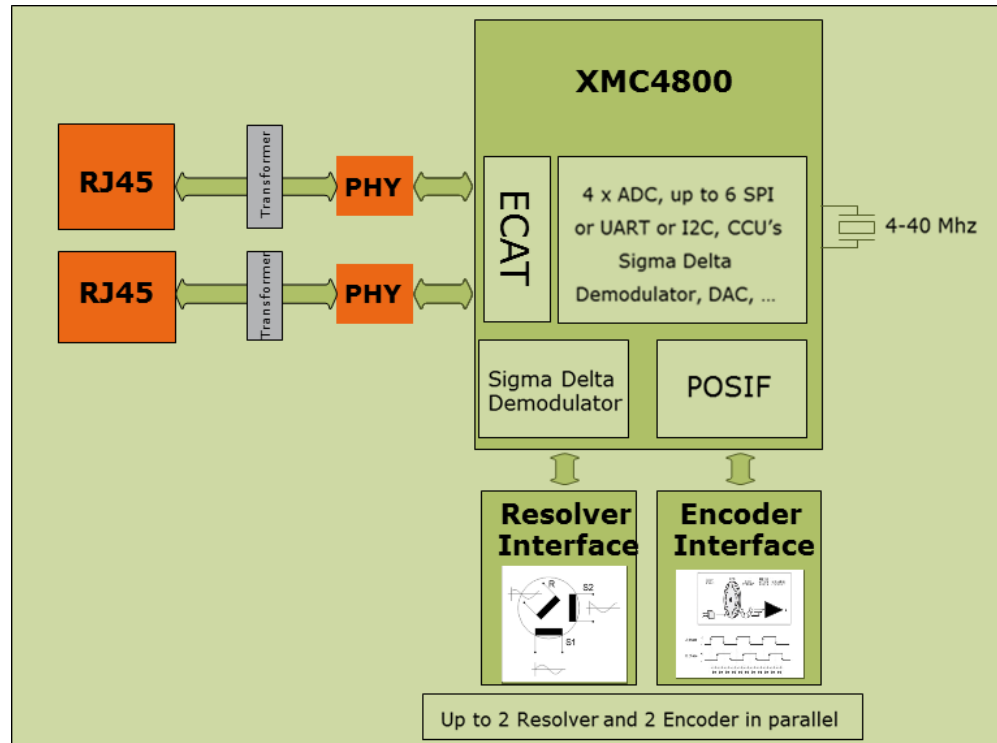# Isolated intelligent I/O's
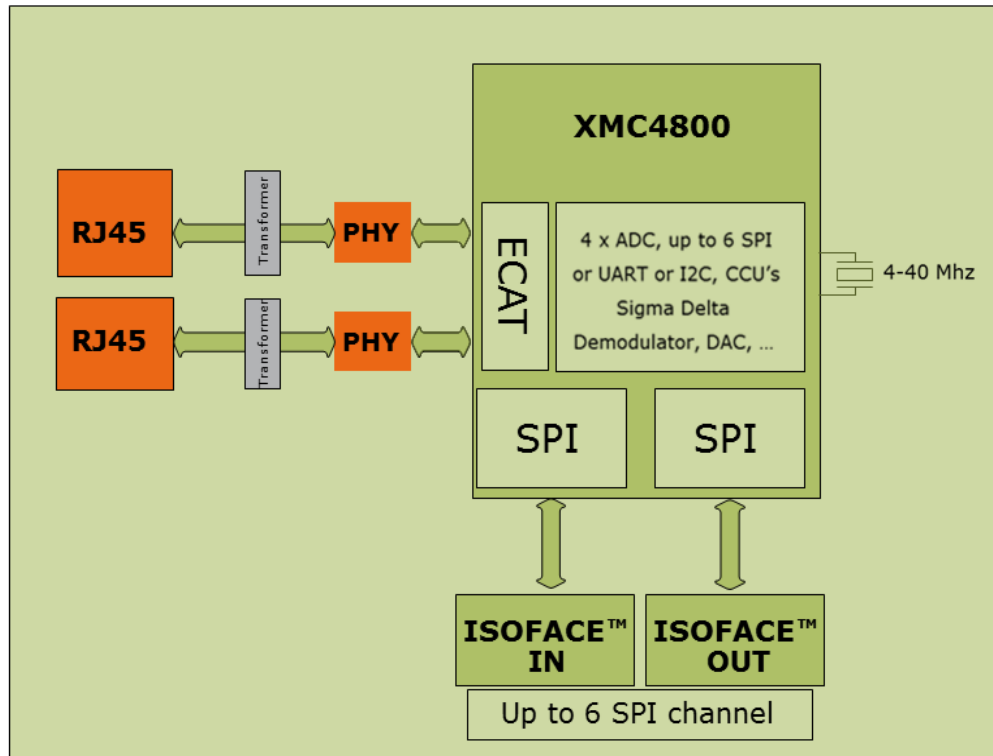
Overview

EtherCAT® is one of the Industrial Ethernet Protocols which is more and more used in Industrial Automation Systems. Starting from simple I/O slices up to complex inverter architectures, EtherCAT® solves the needs of fast real time communication.

In brief

In most automation systems an isolation is needed. The XMC48 offers the possibility for a isolation of the XMC™ MCU and transferring the data over EtherCAT® in a single chip solution.

Application example
Isolated EtherCAT® resolver/encoder interface

Overview

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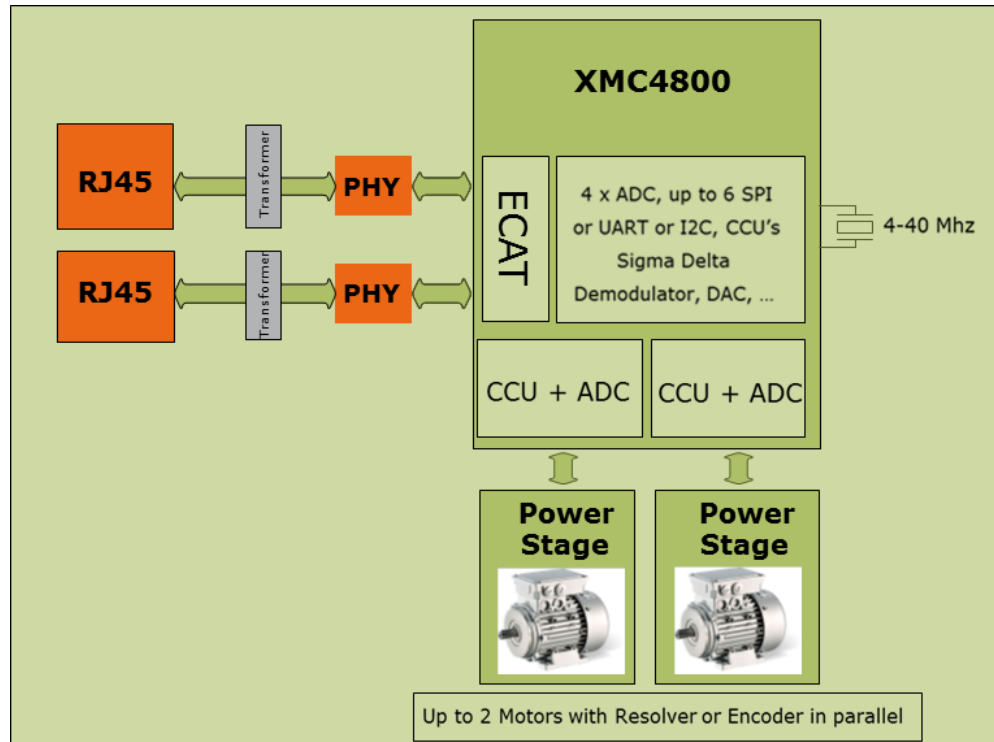
In brief

In combination with the XMC4800 complex solutions like multiple encoder or resolver interfaces in a single chip EtherCAT® solution can be developed. The XMC™ with its huge set of peripherals and hardware trigger using SYNC/LATCH signals demonstrate a ideal solution.

Application example
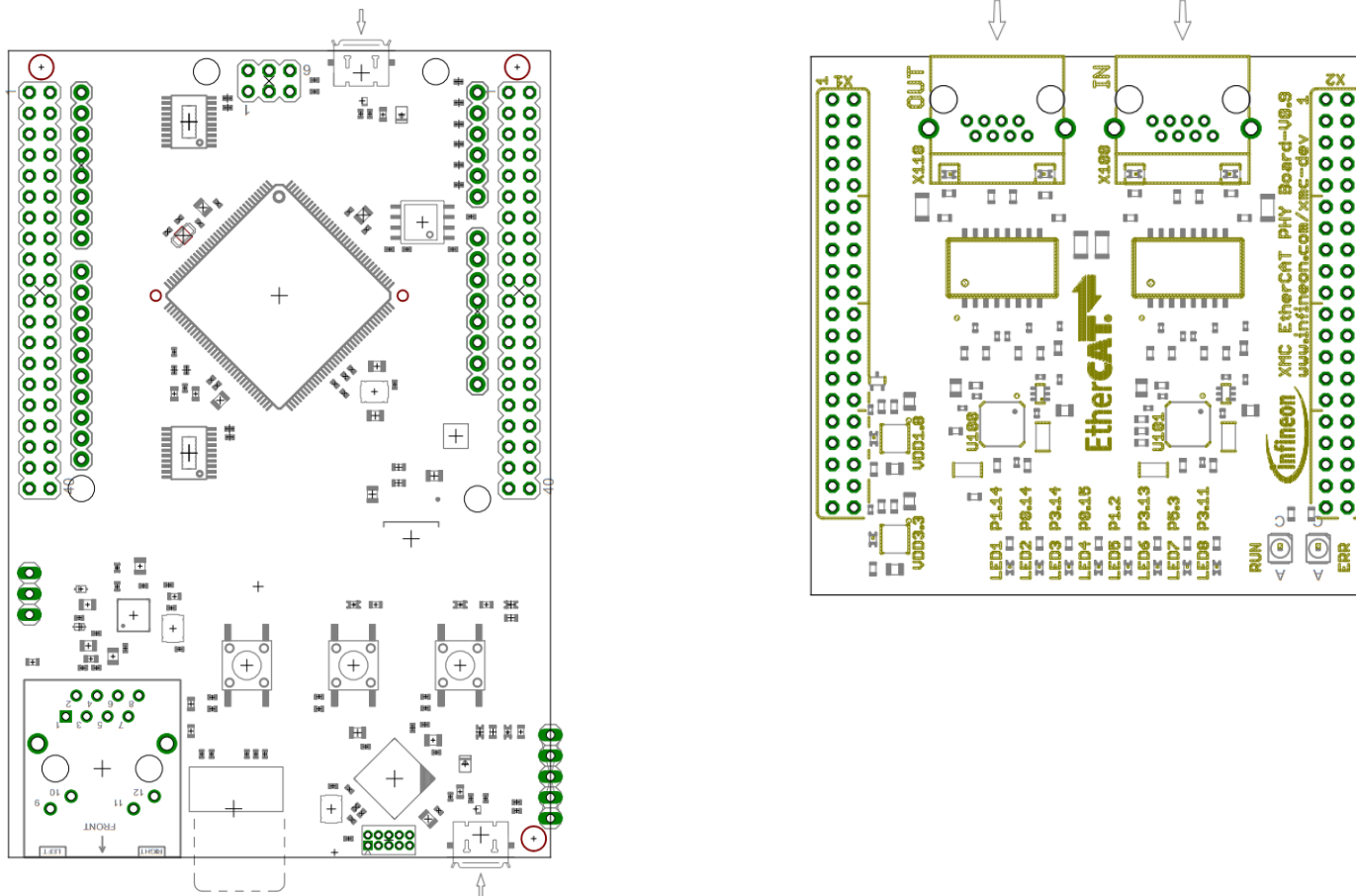# Dual motor control and EtherCAT®

Overview

EtherCAT® is one of the Industrial Ethernet Protocols which is more and more used in Industrial Automation Systems. Starting from simple I/O slices up to complex inverter architectures, EtherCAT® solves the needs of fast real time communication.

In brief

Dual Motor control with the XMC4800 using encoder or resolver interfaces in a single chip EtherCAT® solution can be developed.

http://www.infineon.com/cms/en/product/productType.html?productType=db3a304433b8a41 00133daf9cc041122

Support material

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